

## Summary of the Present Invention

A main object of the present invention is to provide a pure natural bamboo fiber product and the manufacturing method thereof, wherein the bamboo fiber, having good strength and containing any acidity-alkalinity chemical agents, is considered as a substitution of cotton and chemical fiber.

Another object of the present invention is to provide a manufacturing process of bamboo fiber which has a length with respect to a length of the raw bamboo and an average fineness of 1000~3000 metric counts, wherein the manufacturing process comprises the steps of raw material pretreatment, bamboo fiber decomposition, bamboo fiber formation and a bamboo fiber post-treatment. The raw material pretreatment comprises the steps of material organization, bamboo stripping and soaking. The bamboo fiber decomposition comprises at least three cycling steps of boiling, rinsing and fiber decomposition. The bamboo fiber formation comprises the steps of boiling, fiber separating, fiber restore, fiber dehydration and fiber softening. The bamboo fiber post treatment comprises the steps of drying, fiber sorting, selection and inspection.

Another object of the present invention is to provide a bamboo fabric, wherein a natural botanical softener agent is added into the bamboo fiber for softening treatment on the bamboo fiber and enhancing the tensile strength thereof. The threading configuration of the bamboo fiber is over 120,000 counts. The bamboo fiber is adapted to completely replace the traditional chemical fiber, cotton and garmenture. In addition, the clothing (or garment) made from the above process has the characteristics of good air ventilation and softness with strong anti-bacteria such that the bamboo fiber is good for making breezy outfit for summer time. Furthermore, it is good for skin care due to the strong function in anti-UV (ultra-violet) with 0.06% opacity which is much less than the fabric materials of cotton, hemp and silk. Moreover, the manufactured fabric materials maintain the natural characteristics of the raw bamboo, good permeability, convenient rinsing and easy drying. Therefore, the bamboo fibers of the present invention without containing any chemical acidity-alkalinity preparations can prevent the environment from pollution during the manufacturing process.

Accordingly, in order to accomplish the above objects, the present invention provides a clothing fiber comprising at least a bamboo fiber, which is made of natural bamboo, having an average fineness of 1000~3000 metric counts and a length of a

## Title

### **Bamboo Fiber and the Manufacture thereof**

## Background of the Present Invention

### **Field of Invention**

5           The present invention relates to a bamboo product, and more particularly to the bamboo fiber and the manufacture thereof which provides an eco-friendly process to obtain the quality fabrication.

### **Description of Related Arts**

10           In the current clothing or garment industry, due to the advantages of unyielding surface and low cost, it is likely taking over the trend role of cotton and hemp or flax-spun traditional materials by the chemical fiber or synthetic fiber. But, it is conflicted with the current world trends of back-to-nature and health-care-searching. Therefore, if a fiber product can be created from the natural botanical plants, which having both the cotton-spun products characteristics of comfort with well permeability and strong  
15           absorption, and the chemical fiber plus material advantages of softness, unyieldingness, coolness, airiness, slip and low cost, will cause a revolution in the manufacturing of the clothing fabric materials. One among the current existing technologies was reported that the raw bamboo softening technology was already applied in the bamboo fiber manufacturing to produce mainly the plate materials and replace the wooden materials  
20           and its products. Because the softening agent contains alkali, it will pollute the environments during the manufacturing. In addition, the bamboo fiber which is manufactured by the existing method is too soft and easy to broken to manufacture the clothing shell fabric materials.

natural bamboo segment cut from said natural bamboo with no chemical testing agent added.

5        These and other objectives, features, and advantages of the present invention will become apparent from the following detailed description, the accompanying drawings, and the appended claims.

### Brief Description of the Drawings

Fig. 1 is a manufacturing flow diagram of a preferred embodiment of the present invention.

## Detailed Description of the Preferred Embodiment

Referring to FIG. 1 drawing, a bamboo fiber and its manufacture according to a preferred embodiment of the present invention is illustrated, wherein the manufacturing process of the bamboo fiber comprises the following steps.

5           (1) Material organization: cutting a bamboo as a raw material by removing branches, throwing sharp-pollard and sawing into a fixed length of bamboo segment.

          (2) Bamboo stripping: cutting the bamboo segment to form at least a bamboo strip having a width approximately 2mm by a bamboo colliding machine or manually.

10           (3) Bamboo soaking: disposing the bamboo strips into a solution with a specific degumming softening agent for 4 hours, wherein the degumming softening agent is a natural botanical prescription without acidity-alkalinity chemical agent and the concentration ratio of the degumming softening agent to water is 30%.

          (4) First time boiling: boiling the bamboo strip in the soaking solution by a steam boiler at the temperature of 150°C and pressure of 5 kg/cm<sup>2</sup> for 3 hours for aglycoside (de-sweetening process), degreasing and disinfecting.

15           (5) First time rinsing: rinsing the bamboo strip until the solution is removed from the surface of the bamboo strip.

          (6) First time fiber separation: compressing the bamboo strip by a pressing machine, wherein coarse fibers are separated from the bamboo strip and flushed with water flushing for degum (or deglue).

20           (7) Second time boiling: boiling the coarse fibers in a cooking pot filled with the soaking solution at the temperature of 120°C and pressure of 4 kg/cm<sup>2</sup> for 4 hours.

          (8) Second time rinsing: repeating the above step (5).

(9) Second time fiber separation: decomposing the coarse fibers into finely fibers while the finely fibers are flushed by water for degum.

(10) Third time boiling: boiling the finely fibers in the cooking pot filled with the soaking solution at the temperature of 100°C and pressure of 3 kg/cm<sup>2</sup> for 5 hours.

5 (11) Third time rinsing: repeating the above step (5).

(12) Third time fiber separation: repeating the above step (9).

(13) Fourth time boiling: adding a bleach powder into the soaking solution and repeating the above step (10).

10 (14) Fourth time fiber separation: separating the finely fibers by manual until the fineness thereof is approximately 1,687 metric counts while the length of the finely fibers is maintained as the length of the bamboo segment.

(15) Fiber restore: soaking the finely fibers into the soaking solution with proper added agent therein to enhance the strength of the finely fiber.

15 (16) Fiber dehydration: removing water contents of the finely fibers by a centrifugal vacuum pump (or called as “general dehydrating method”).

(17) Fiber softening: applying softener to the finely fibers to soften the finely fibers having the softness level of hemp botanical plant.

20 (18) Fiber desiccation: drying the finely fibers by a specific drier at the temperature between 80°C and 120°C for 30 minutes to keep the water content rate below 10%.

(19) Fiber sorting: combing the finely fibers by a carding machine and sorting the bamboo fibers.

(20) Quality Check: selecting and sifting dried bamboo fibers that the shorter bamboo fiber and bamboo powder are discarded so as to keep the bamboo fiber above

95% by weight, and packaging as the bamboo fibers as the industrial fabric materials after passing the examinations.

Based on the examinations approved by GB/T6100-1985 and GB/T13783-1992, the test results of the bamboo fiber of the present invention versus high-grade cotton are:

5 (A) yarn density: 544 mtex of bamboo fiber versus 167 mtex of cotton fiber; (B) fiber breakage ratio strength: 37.4 cN/tex of bamboo fiber versus 20.2 cN/tex of cotton fiber; (C) extension at break: 4.1 % of bamboo fiber versus 8.1 % of cotton fiber, wherein the bamboo fiber is one of the cellulose fibers.

10 The manufacturing process of the bamboo fiber according to the second embodiment of the present invention has the steps same as the above manufacturing steps of the first embodiment, except the step (4) of boiling the bamboo strip in the soaking solution at the temperature of 80°C and the pressure of 3 kg/cm<sup>2</sup> for 5 hours.

The bamboo fiber of the present invention is adapted for silk spinning (or schappe spinning, schappe-spun), hemp-spinning and cotton spinning, and also for blending

15 by mixing the above fibers, the pure bamboo fiber with the least fineness is adapted for 48 Ne British counts of yarns, and the blending is for 80 Ne British counts of yarns. Therefore, the bamboo fiber with softness and strength and comfort is not worse than any other face fabric materials; furthermore, the bamboo fiber with the natural characteristics of bamboo materials, such as the functions of airiness, summer sunshine protection,

20 permeability and anti-UV, which is much better than the common face fabric materials, especially in its low cost, convenient sourcing, easy rinsing and fast drying.

One skilled in the art will understand that the embodiment of the present invention as shown in the drawings and described above is exemplary only and not intended to be limiting.

25 It will thus be seen that the objects of the present invention have been fully and effectively accomplished. Its embodiments have been shown and described for the purposes of illustrating the functional and structural principles of the present invention and is subject to change without departure from such principles. Therefore, this invention includes all modifications encompassed within the spirit and scope of the following

30 claims.